



California Public Utilities Commission

RENEWABLES PORTFOLIO STANDARD

Quarterly Report

OCTOBER 2008



I. ABOUT THE RPS AND THIS REPORT

California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's RPS obligates investor-owned utilities (IOUs), energy service providers (ESPs) and community choice aggregators (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are jointly responsible for implementing the program.

This report highlights:

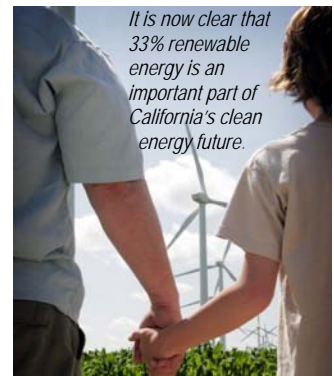
- Major challenges and solutions to achieving a 33% RPS by 2020
- The three-legged stool: achieving a 33% RPS will require greater coordination between energy policy; resource and transmission planning; and procurement
- CPUC's process to analyze the costs, feasibility, barriers, and solutions to reaching a 33% RPS by 2020

II. ADOPTING MORE AGGRESSIVE RENEWABLE ENERGY TARGETS

33% renewables is a key component to California's clean energy future

A 33% renewable energy target would further California's efforts to address climate change and lead the nation in clean energy policy. In October 2008, the CPUC and the California Energy Commission recommended 33% renewables¹ as a key strategy to reducing greenhouse gas emissions: "We recommend that ARB [California Air Resources Board] adopt requirements that by 2020 at least 33% of California's electricity needs be met by renewable resources, and that by 2020 each retail provider obtain at least 33% of the electricity delivered to its customers from renewable resources. ... We also support ongoing analysis of the implementation path needed, the actions we can take to help ensure success, and the potential costs and benefits of renewables in the context of AB 32."² The California Air Resources Board's proposed scoping memo adopts a statewide 33% by 2020 "renewable energy mix" in order to achieve the goals of the Global Warming Solutions Act (Assembly Bill 32).³ Since current RPS statute prevents the CPUC from requiring California's IOUs to procure more than 20% of their electricity from renewable sources, legislation is needed to codify 33% renewables.

It is now clear that 33% renewable energy is an important part of California's clean energy future. As a result, the state must start asking the question *how will the state achieve 33% renewable energy by 2020?* The CPUC has set up a process to begin to answer this question.⁴ Through this analysis, CPUC staff will postulate plausible resource mixes and identify reasonable implementation pathways to achieve a 33% RPS by 2020. CPUC staff will also estimate the cost to reach a 33% RPS, as well as assess the market, financial, and regulatory barriers, and propose solutions needed to transform California's existing fossil electricity infrastructure to one that supports a renewable paradigm.



¹ D.08-10-037 recommends that 33% of California's electricity be generated by renewables by 2020, and discusses that this goal could be met through a variety of approaches which, in addition to RPS and the California Solar Initiative, could include "voluntary private sector investment and additional distributed renewables programs."

² D.08-10-037, the Final Opinion on Greenhouse Gas Regulatory Strategies, http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/92591.htm

³ ARB Proposed Scoping Memo, October 2008: <http://www.arb.ca.gov/cc/scopingplan/document/psp.pdf>.

⁴ This initiative is a staff-driven investigation within the 2008 Long-Term Procurement Plan (LTPP) proceeding (R.08-02-007), which may inform subsequent LTPP proceedings in which the Commission considers and adopts utilities' plans. (See August 28, 2008 Scoping Ruling: <http://docs.cpuc.ca.gov/efile/RULC/87248.pdf>)

III. MAJOR CHALLENGES FACING A 33% RPS

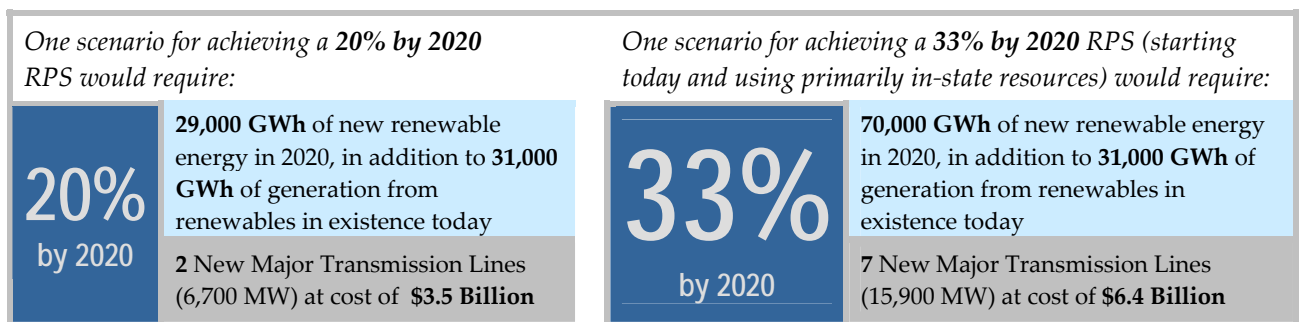
Major challenges that may inhibit California's ability to reach a 33% RPS by 2020⁵

1. The magnitude of a 33% RPS is unprecedented.
2. Transmission planning, permitting, and construction require substantial lead times, which could inhibit timely delivery of renewable energy.
3. The impact of integrating large amounts of intermittent renewable energy on grid-reliability of the transmission system is not yet known.
4. Permitting of renewable generation facilities can be complex, long, and uncertain.
5. The costs of renewable projects are increasing; the state needs a process to evaluate these costs and resource alternatives.
6. Other project development barriers, such as financing and equipment procurement, affect the state's ability to reach a 33% RPS by 2020.

The magnitude of a 33% RPS is unprecedented

As discussed in our July 2008 Report to the Legislature, the magnitude of a 33% by 2020 RPS is unprecedented. Serving 33% of California's energy needs with renewable sources will require an infrastructure build-out on a scale and timeline perhaps unparalleled anywhere in the world.

Figure 1.⁶



According to the scenario described in the chart above, a 33% RPS would require about 40,000 GWh of additional renewable energy beyond what is required for the current 20% goal. Since the CPUC anticipates that IOUs will reach the 20% target in or around 2013, the IOUs will have approximately 7 years to increase renewable generation by about

⁵ The rest of the report will refer to a 33% RPS instead of 33% renewables. Given the complexity of the topics in this section, the solutions provided are not exhaustive.

⁶ Energy and Environmental Economics (E3), Inc., www.ethree.com; E3, a consulting firm recently completed modeling work for the CPUC on achieving greenhouse gas reductions from the electricity sector, and has estimated the energy, capacity, and transmission requirements possible under a 20% by 2020 and a 33% by 2020 RPS for all California load serving entities. The inputs in this table are from the E3 analysis. This table is also referenced in the July 2008 Report to the Legislature: http://docs.cpuc.ca.gov/word_pdf/REPORT/85936.pdf.

68%. While the above scenario provides cost estimates, it should be noted that any current discussion of cost is very speculative given uncertainty regarding generation, transmission, and integration costs. The process outlined in Section V will address this uncertainty and provide a more robust estimate of total costs.

Transmission planning, permitting, and construction require substantial lead times, which could inhibit timely delivery of renewable energy

A major barrier to the development of RPS projects is access to transmission. California's transmission system is constrained, and renewable resources are often located far from load centers and existing transmission lines.

- **Problem:** Renewable resources are often located far from the grid and load centers, requiring permitting and construction of extensive and expensive transmission lines. Large transmission projects are needed, however, to access distant geographic areas that have economic renewable resources.⁷



- **Solution:** The Renewable Energy Transmission Initiative (RETI)⁸ is a statewide, multi-stakeholder initiative to identify the transmission projects needed to accommodate the state's renewable energy goals and facilitate transmission planning and permitting. RETI will have completed the first phase of its review by the end of this year and will have ranked the competitive renewable energy zones in California and neighboring states.

- **Problem:** Renewable resources are often location-constrained. Multiple renewable projects are often located within a renewable resource area, yet the costs to interconnect to the transmission grid are cost-prohibitive for a single project.

- **Solution:** The California Independent System Operator's (CAISO's) new Location-Constrained Resource Interconnection process⁹ provides a framework for planning and sharing the costs of large transmission facilities that interconnect location-constrained renewable resource areas.¹⁰

⁷ July 2007 Report to the Legislature: http://docs.cpuc.ca.gov/word_pdf/REPORT/69823.pdf

⁸ <http://www.energy.ca.gov/reti/index.html>

⁹ <http://www.caiso.com/1816/1816d22953ec0.html>

¹⁰ http://www.cpuc.ca.gov/PUC/energy/wholesale/02_planning/02_ire/lcri.htm

- **Problem:** The CAISO's large generator interconnection procedure (LGIP) to interconnect generating facilities to the grid was not designed to interconnect numerous renewable projects located far from load and the existing grid. LGIP has not been able to address the dramatic increase in renewable development over the past two years.¹¹ As a result, the CAISO has a backlog of renewable projects waiting for an interconnection study.

- **Solution:** The CAISO established the Generation Interconnection Process Reform (GIPR)¹² to reform its interconnection procedures and address the needs of renewable projects. The Federal Energy Regulatory Commission (FERC) recently approved the reforms, and the CAISO is working to implement the new process.
- GIPR is expected to increase the speed and efficiency of studying interconnection requests by planning common transmission solutions for groups of generation projects and integrating such planning into the CAISO annual transmission planning process. The GIPR proposal intends to complete the first set of interconnection cluster studies by the second quarter of 2010, which will help clear much of the backlog.

- **Problem:** Transmission planning and approval involves substantial lead time and various interdependent evaluations and approval processes. The state lacks a coordinated and efficient process to support expedited review and approval of proposed transmission lines that respects jurisdictional boundaries and statutory obligations, while allowing entities to benefit from information-sharing and coordinated review. As a result, it can take 7-10 years to plan, permit, and construct a new transmission line.

- **Solution:** The CPUC is beginning to coordinate resource and transmission planning, procurement, and policy. For example, the renewable transmission policy proceeding¹³ is exploring proactive transmission permitting to further streamline the Certificate for Public Necessity and Convenience (CPCN) CEQA¹⁴ review process. The LTPP proceeding is standardizing assumptions and inputs that the IOUs will use to develop their LTPPs, which could be incorporated into CPCN proceedings when determining need for a transmission line. This type of coordination could help inform future review of transmission projects.

¹¹ January 2008 Report to the Legislature: http://www.cpuc.ca.gov/NR/rdonlyres/F710CD37-3053-439C-B2A4-07CCB5D8B287/0/RPS_Rpt_to_Legislature_January_2008.DOC.

¹² <http://www.caiso.com/1f42/1f42c00d28c30.html>

¹³ Rulemaking: I.08-03-010/R.08-03-009, <http://docs.cpuc.ca.gov/published/proceedings/R0803009.htm>

¹⁴ CEQA is the California Environmental Qualifications Act

The impact of integrating large amounts of intermittent renewable energy on grid-reliability of the transmission system is not yet known

The CAISO, through the Integration of Renewable Resource Program (IRRP),¹⁵ is working with stakeholders to identify integration issues and solutions for the integration of large amounts of renewable resources into the CAISO Control Area. As the state increases its dependence on intermittent renewable resources, the system must still provide reliable electricity services, which will add to the total costs of reaching a 33% RPS.

- **Problem:** Flexible resources such as fossil peaker plants, dispatchable demand response, and energy storage will likely be needed to provide grid support services for intermittent renewable resources. According to the CAISO's analysis of a 20% RPS, "As wind generation further increases, the amount of variability will increase non-linearly... An increase of the RPS to 33% could more than double the integration problems and costs."¹⁶

- **Solution:** The CAISO will identify the amount and type of resources needed to maintain grid reliability under a 33% RPS. The CAISO will use the resource build-outs developed through the 33% RPS Implementation Analysis (see Section V) to determine the best mix of resources that would be required to provide regulation, load following, and ramping needs to meet the higher RPS goals. Once the CAISO determines this need, the LTPP proceeding can authorize procurement of these resources. The CAISO will complete this analysis during the third quarter of 2009.¹⁷

Permitting of renewable generation facilities can be complex, long, and uncertain

Renewable generation facilities must receive a site permit in order to construct a project. The type of permit needed depends on three factors: a) technology type, b) project size and c) project location. The California Energy Commission is responsible for approving permits for thermal power plants 50 MW and greater. All other projects must receive a county or city permit. Projects on federal land must also receive permits from the appropriate federal agencies – usually the Bureau of Land Management (BLM) or the United States Forest Service (USFS). Most renewable facilities must seek a permit from a federal agency since many of the best solar, wind, and geothermal resource sites are on federal land.

- **Problem:** Environmental permitting of new renewable projects poses a major challenge given the sensitive nature of the large areas of land needed to reach a 33% RPS with utility-scale renewables. Public agencies responsible for environmental permitting of power plants at the county, state, and federal levels

¹⁵ <http://www.caiso.com/1c51/1c51c7946a480.html>

¹⁶ CAISO Report, "Integration of Renewable Resources," November 2007.

<http://www.caiso.com/1ca5/1ca5a7a026270.pdf>

¹⁷ PowerPoint Presentation from the IRRP Stakeholder Meeting, October 24, 2008.

<http://www.caiso.com/2068/2068e25620c90.pdf>

have been inundated with applications for new renewable generation facilities. For example, the BLM is currently reviewing 176 wind and solar permit applications that cover 1.3 million acres of land.¹⁸ The California Energy Commission has also received 5 applications to permit solar thermal projects over 50 MW in size, which are currently under review.¹⁹

Figure 2.

| BLM Applications as of May 2008 ²⁰ | | | | | |
|---|--------|---------------|--------|----------|-----|
| Solar PV | | Solar Thermal | | Wind | |
| Projects | MWs | Projects | MWs | Projects | MWs |
| 32 | 20,625 | 100 | 74,588 | 144 | 642 |

- **Solution:** In August 2007, the California Energy Commission and the BLM entered into a Memorandum of Understanding (MOU) in order to conduct a joint environmental review of renewable projects that fall under both of their jurisdictions. The BLM has also launched a Programmatic Environmental Impact Statement (PEIS) assessing utility-scale solar energy development on BLM-administered lands.²¹ Such initiatives are the first steps towards streamlining the permit review process.

The costs of renewable projects are increasing and the state needs a process to evaluate these costs and resource alternatives

Construction costs are increasing for both renewable and conventional generation, and the RPS program has seen a rise in bid and contract prices since the program began in 2002 (see our July 2008 Report for more discussion). Reaching a 33% target will require procurement of more expensive renewables -- preliminary analysis indicates that such a target may require a state investment of about \$60 billion in generation and transmission from 2010 to 2020.²²

¹⁸ California Energy Commission Committee Draft 2008 Integrated Energy Policy Report Update: <http://www.energy.ca.gov/2008publications/CEC-100-2008-008/CEC-100-2008-008-CTD.PDF>.

¹⁹ California State Auditor, *Solar energy: As the cost of this resource becomes more competitive with other renewable resources, applications to construct new solar power plants should increase*, Report No. 2007-119, January 2008. <http://www.bsa.ca.gov/pdfs/reports/2007-119.pdf>

²⁰ RETI phase 1B report: http://www.energy.ca.gov/reti/documents/2008-08-16_PHASE_1B_DRAFT_RESOURCE_REPORT.PDF.

²¹ <http://solareis.anl.gov/>

²² Energy and Environmental Economics analysis, www.ethree.com, previously cited in the July 2008 Report to the Legislature: http://docs.cpuc.ca.gov/word_pdf/REPORT/85936.pdf.

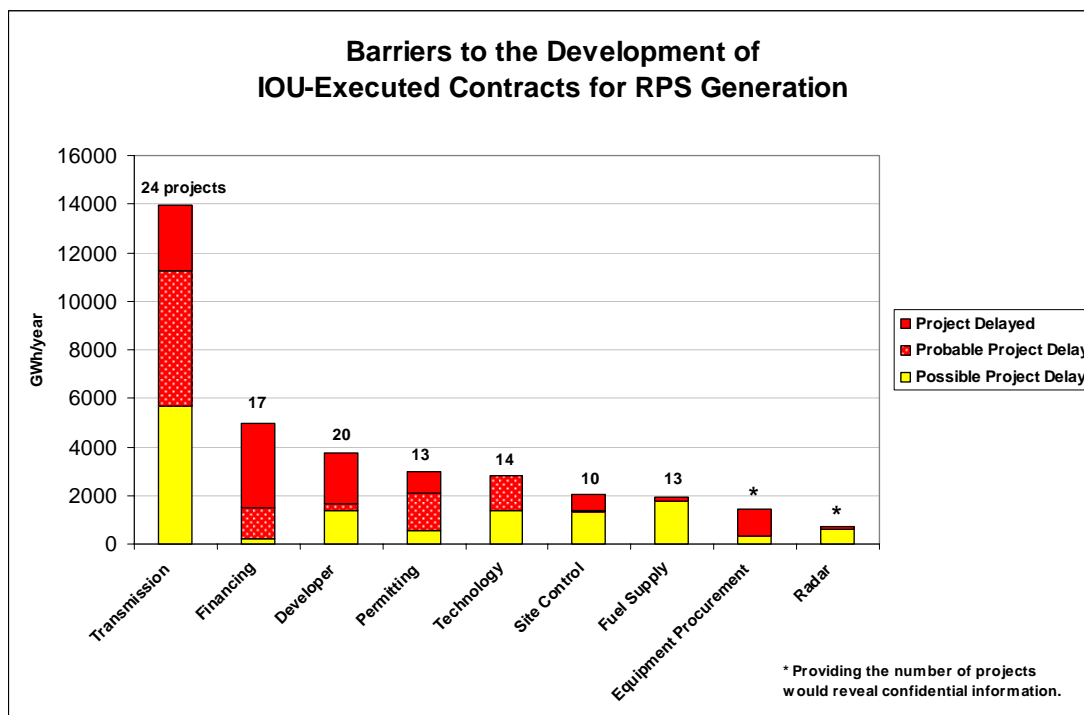
- **Problem:** The state does not have stakeholder vetted information on the total costs or rate impact of achieving a 33% RPS by 2020. Without an estimate of total costs, the CPUC cannot accurately compare the trade-offs between increased levels of renewable energy and other non-renewable resources that reduce greenhouse gases.

- **Solution:** CPUC staff will estimate the total costs of achieving a 33% RPS through the 33% RPS Implementation Analysis (see Section V). This analysis will construct plausible resource build-outs to meet a 33% RPS, and will estimate the costs of the associated renewable generation, transmission, and grid integration. Furthermore, the analysis will inform development of a methodology to fairly evaluate the value of baseload, intermittent, and peaking renewable resources.

Other project development barriers, such as financing and equipment procurement, affect the state's ability to reach a 33% RPS by 2020

The CPUC has identified a number of barriers affecting current RPS projects, including extension of the federal production tax credits, transmission, developer inexperience, financing, site-control, price, military radar, technology, fuel supply, equipment procurement, and other sources of risk.

Figure 3.



ABOUT THIS GRAPH:

- The production tax-credit, while not depicted, is a risk factor for all wind projects with an online date after 2010.²³
- Additional projects are expected to experience delays due to financing challenges as a result of the recent financial crisis and a projected shortage in tax equity providers.²⁴
- Additional projects are expected to experience delays due to the permitting and site control challenges described in this Section.
- **Problem:** These project development barriers are outside the CPUC's control and the extent to which they may jeopardize the achievement of a 33% RPS is not yet well understood. For example, financing has been a source of delay for several CPUC-approved projects, and the current "credit crunch" may exacerbate this problem.

- **Solution:** The CPUC will conduct a barrier analysis through the 33% RPS Implementation Analysis. This analysis will identify the project barriers and implementation steps to overcome each barrier (see Section V). The analysis will also identify legislative and administrative solutions for policy-makers to overcome these challenges.

IV. THE THREE-LEGGED STOOL TO REACH 33% RENEWABLE ENERGY

Coordination of energy policy; resource and transmission planning; and procurement

If the state is to reach a 33% RPS by 2020, the 2020 greenhouse gas goals codified in AB 32, and the 2050 greenhouse gas goals defined in the Governor's Executive Order S-3-05, then energy policy; resource and transmission planning; and procurement need to be coordinated across multiple agencies so that California can efficiently and effectively develop the necessary infrastructure.



²³ The production tax credit for wind facilities expires December 31, 2009.

http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=US13F&State=Federal%C2%A4tpageid=1

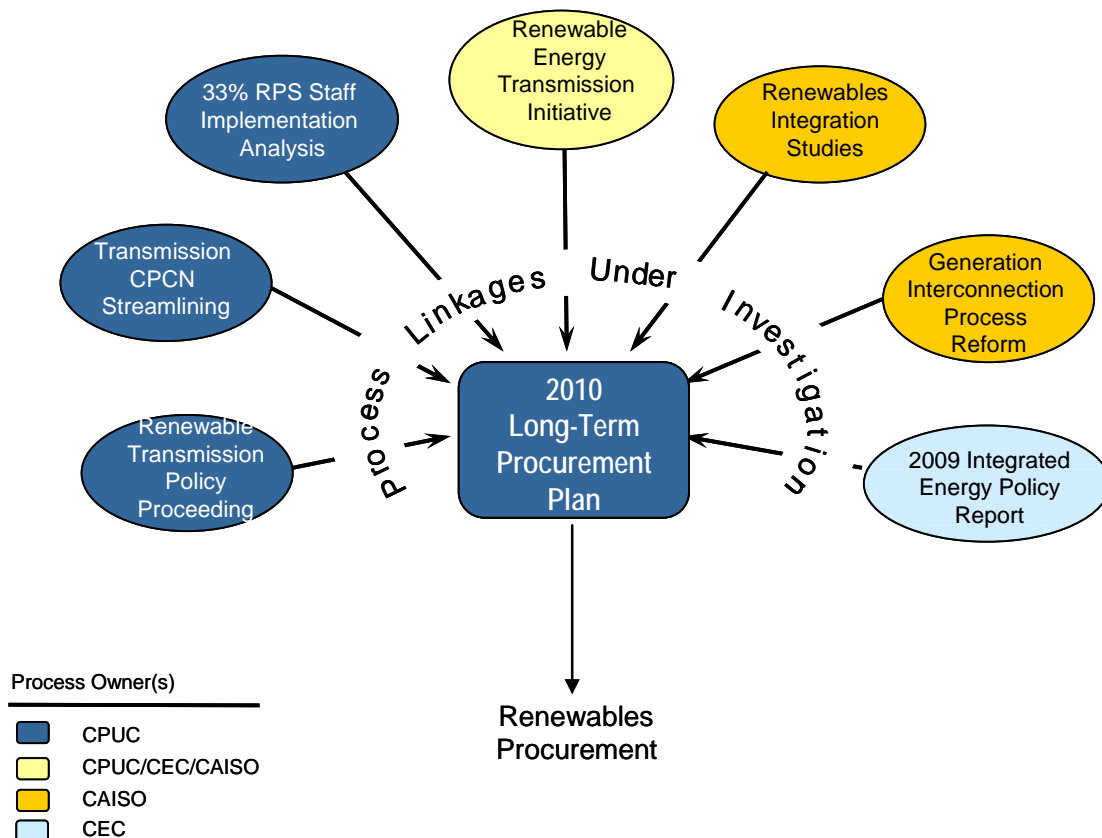
²⁴ Financial experts at Solar Power International 2008 predicted that as a result of the financial crisis, there will be a shortage of firms willing to partner on tax equity, which is crucial to financing of renewable energy projects that use the investment tax credit or the production tax credit. October 14-16, 2008:

<http://www.solarpowerconference.com/>

Energy policy; resource and transmission planning; and procurement form a three-legged stool of mutually interdependent processes. Absent any one of the three, the state will be unable to reach its energy policy goals. For example, if the state is required to generate 33% of its energy from renewable resources by 2020, then all new procurement of new energy resources between now and 2020 must be entirely renewable energy, except some new fossil for peaking capacity and to replace aging fossil plants critical to renewable integration.²⁵

At this time, the CPUC's Energy Division is investigating ways to integrate renewable resource planning into the Long-Term Procurement Plans (LTPP) proceeding in order to ensure that the state's IOUs begin to plan for and evaluate a 33% RPS scenario. The CPUC is evaluating these process linkages in the 2008 LTPP proceeding²⁶ with goal of coordinating the three legs of the stool in the 2010 LTPP proceeding, as depicted in the diagram below.

Figure 4.



²⁵ Energy and Environmental Economics analysis, www.ethree.com, previously cited in the July 2008 Report to the Legislature: http://docs.cpuc.ca.gov/word_pdf/REPORT/85936.pdf.

²⁶ See August 28, 2008 Scoping Ruling: <http://docs.cpuc.ca.gov/efile/RULC/87248.pdf>

V. THE CPUC'S 33% RPS IMPLEMENTATION ANALYSIS

CPUC staff will evaluate a 33% RPS scenario within the 2008 LTPP proceeding. This 33% RPS Implementation Analysis will consist of three parts and will develop:

- Part A:** Renewable resource build-outs
- Part B:** Barrier analysis
- Part C:** Implementation solutions and 33% cost impact

The 33% RPS Implementation Analysis will serve multiple purposes. First, it will help define the impact of a 33% RPS on the 2010 IOU LTPPs and thus help inform their development. Second, it will provide a rigorous assessment of the percentage of renewable energy that is feasible given the costs and project development challenges. Third, it will provide the CPUC and other state entities the information needed to develop and implement solutions to overcome these challenges. Lastly, it will provide decision-makers in California the tools to craft renewable energy policies.

Part A: Resource Build-outs

Part A of this analysis will define the magnitude of the renewable resources needed to reach a 33% RPS and estimate preliminary cost and 2008 rate impacts. As a first step, CPUC staff will work with stakeholders participating in the LTPP working groups to develop resource “build-outs,” using RETI analysis to the greatest extent. The resource build-outs will represent a range of plausible resource mixes or infrastructure investment plans that could be built over the next 10 years to reach the state’s energy policy goals. This analysis will define the trade-offs associated with different levels of renewable penetration.

Once the resource build-outs are complete and have been vetted through a public stakeholder process, the CAISO will use the resource build-outs in its 33% renewable integration analysis. After the CAISO has quantified the amount and type of resources needed to integrate large levels of renewable energy, CPUC staff will work with stakeholders to develop cost inputs that will contribute to the state’s understanding of the total costs of a 33% RPS and inform the 33% RPS Implementation Analysis.

Part B: Barrier Analysis

Unlike past assessments of a 33% RPS, this analysis will conduct a barrier analysis and construct a timeline consisting of the steps necessary to build renewable energy projects in California. The analysis will identify sources of project delay and failure, and provide a realistic assessment of when the state can achieve a 33% RPS given the current project development challenges. The resulting timeline will be layered over the 33% renewable resource build-outs. Specifically, this analysis will evaluate and identify:

- Environmental constraints, such as land-use restrictions, endangered species and habitat, and cultural resources
- Market constraints, such as manufacturing capacity
- Regulatory barriers, such as access to transmission
- Other project development barriers, such as financing, developer experience, and site-control

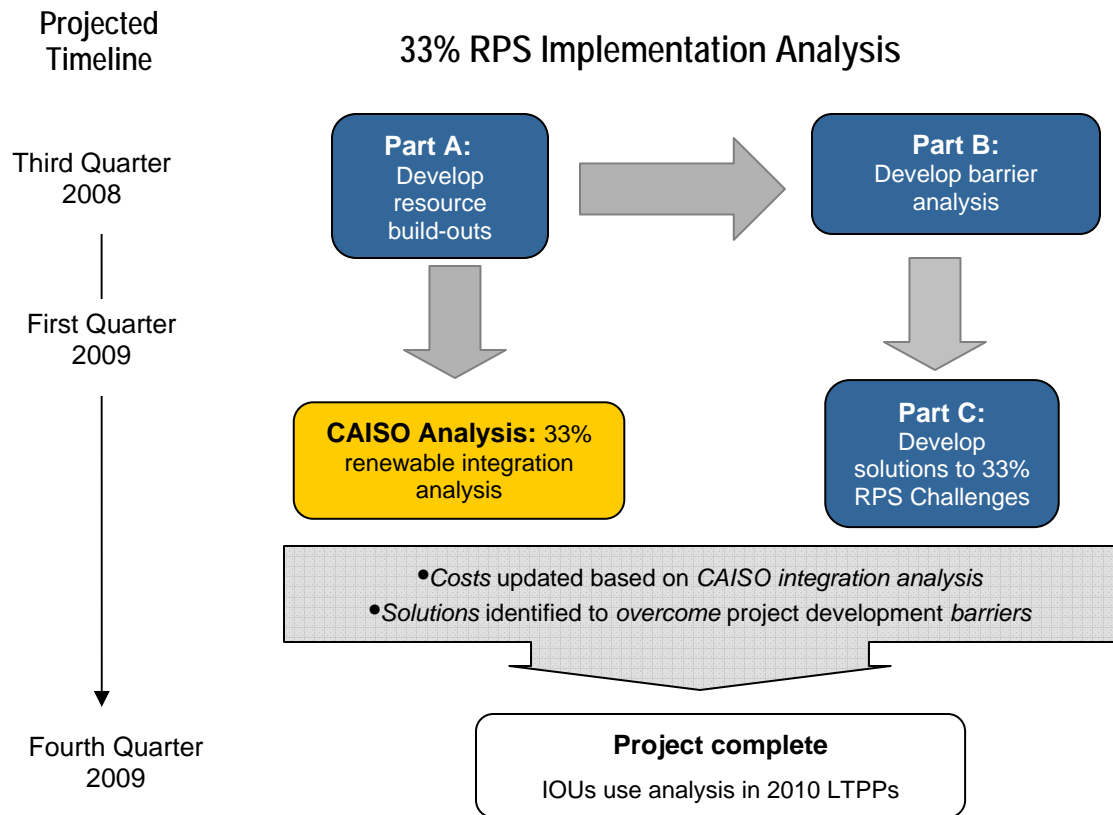
Part C: Solutions to Renewable Project Development Barriers

The CPUC, in coordination with other state entities, will use the barrier analysis to develop a multi-agency workplan for achieving 33% renewable energy. If the state legislates 33% renewable energy, then all state entities and local and tribal governmental partners must work together to develop and implement identified solutions.

Project Schedule

CPUC staff has begun the 33% RPS Implementation Analysis and will complete Part A and Part B by early 2009. The CAISO will use the resource build-outs from Part A to perform its 33% renewable integration assessment, and will complete this assessment by late 2009. After Part B is complete, CPUC staff will work with other state entities to develop and implement solutions to the challenges identified in the barrier analysis. The 33% RPS Implementation Analysis is projected to be completed in the fourth quarter of 2009 and will consist of a report identifying the renewable build-outs, renewable project barriers and solutions, and total costs of achieving a 33% RPS.

Figure 5.



Contact Information

For more information, please visit our website at <http://www.cpuc.ca.gov/PUC/energy/electric/RenewableEnergy/> or contact Paul Douglas, RPS Program Supervisor at psd@cpuc.ca.gov.